

# NASA TECH BRIEF



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## Battery Case Shear

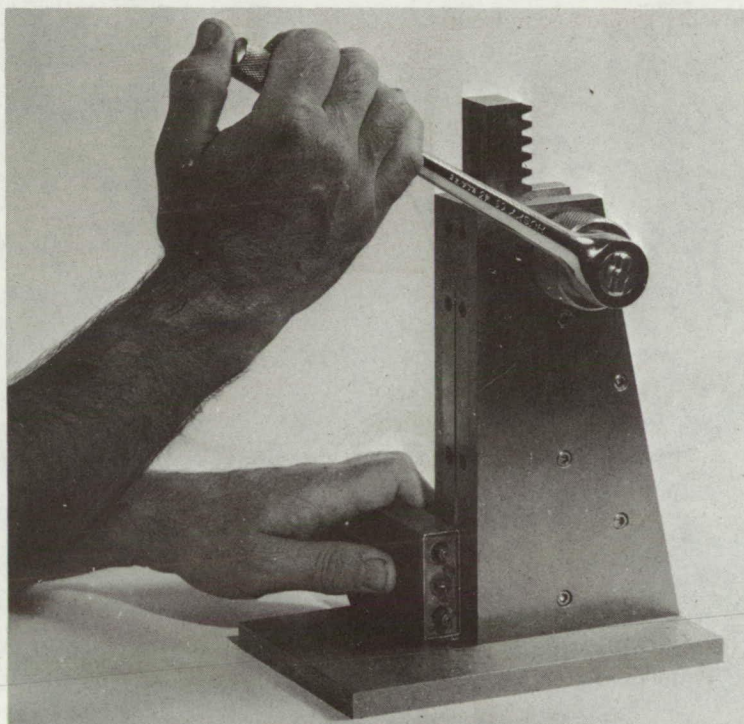


FIGURE 1. HAND-OPERATED BATTERY CASE SHEAR

In order to observe and analyze performance of charged battery components (plates, electrolyte, and insulators) during test, it is necessary to remove the case. Nickel-cadmium cells used in space applications are normally clad in 0.020- to 0.030-inch 304L stainless steel. While the electrolyte is of the paste type, and will not be lost when the case is opened, it must not be contaminated or disturbed in any way during the case removal process.

To accomplish battery case removal while maintaining internal component integrity, a hand operated shear, as shown in Figure 1, has been fabricated. The shear combines all the features required to accomplish battery case removal without disturbance to internal components. The blade assembly consists of three tool-steel elements, two stationary and mounted vertically in parallel with their cutting edges separated by  $0.065 \pm 0.001$  inch. Between these elements, the

(continued overleaf)

cutter blade, approximately 0.062-inch wide operates at a cutting angle of 45° from the vertical by means of a rack and pinion driven by a hand-held lever that provides the mechanical advantage required to cut steel.

In operation, the angle of cut produces a continuous strip that curls away from the battery case into the slot formed by the two stationary blades, as shown in Figure 2, thus protecting internal components from contamination. Initial downward movement of the lever punctures the case at point of contact. Continued downward movement peels a strip from the case, which is rotated by hand 90° each time the cutter blade reaches a corner, until a continuous strip has been removed. The case below the cut is then easily removed. When the sidewalls of the case are deformed, two cuts are necessary. After the initial cut around the case just below its top, a second cut

is made down one of the narrow sides, across the bottom, and up the other narrow side. The case is then easily separated and removed in two sections.

#### Notes:

1. Several cutter blades may be machined with different exposure lengths to provide a set with shearing capability for a wide variety of battery cases.

2. Documentation is available from:

Clearinghouse for Federal Scientific  
and Technical Information

Springfield, Virginia 22151

Price \$3.00

Reference: TSP69-10127

#### Patent status:

No patent action is contemplated by NASA.

Source: Stanley Patro  
(GSC-10783)

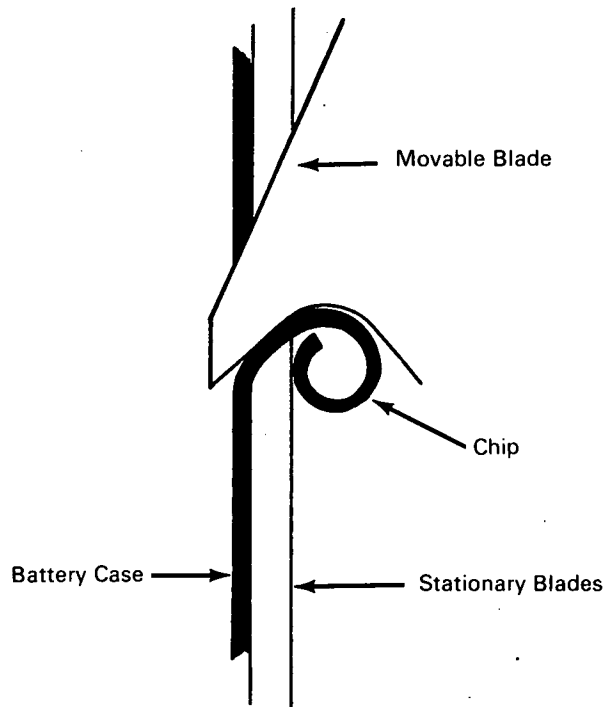


FIGURE 2.